REMARKS

The Office Action of February 23, 2006 has been received and its contents carefully considered.

This Amendment cancels claim 2 and transfers the subject matter to claim 1. Similarly, the Amendment cancels claim 10 and transfers the subject matter to independent claim 9. In addition, the Amendment changes the dependencies of several claims that previously depended from the now-canceled claims 2 and 10. Finally, the Amendment cancels claims 5-7 and 13-15, and adds new claims 19 and 20 to further protect the invention. It is noted that new claim 19 is supported (for example) by the first full paragraph on page 7 of the application. New claim 20 is supported (for example) by the paragraph bridging pages 25 and 26.

The present application addresses the problem of detecting synchronization errors in a received signal. In Applicant's technique, synchronization in consistencies are detected within the received signal itself. The basic strategy is to examine the rising or falling transitions in the received signal. If the signal is being properly received, without drop-ins or drop-outs, all such transitions should be separated in time by integer multiples of the symbol interval. Applicant's technique exploits this fact by comparing the transitions in the received signal with a series of numbers that repeat cyclically, with a cycle length equal to the symbol interval (see, for example, the upper proportion of Figure 4 of the present application's drawings). All transitions should occur at the same point in the cycle of numbers if there are no synchronization errors. Synchronization errors can be detected because they change the point in the cycle at which the transitions occur.

The Office Action rejects all of the claims for obviousness based on patent 5,727,035 to Hiramatsu in view of patent 6,856,658 to Baba et al. (which will hereafter be called "Baba"). It is respectfully submitted, though, the inventions defined by the current formulation of the independent claims are patentable over these references.

The Hiramatsu reference, like the present application, is directed to the problem of detecting synchronization errors in a received signal. Hiramatsu, however, detects such synchronization errors using a completely different approach. In Applicant's techniques, synchronization inconsistencies are detected **within the received signal itself**, while Hiramatsu detects inconsistencies between the received signal and a reference signal. Hiramatsu assumes that the received signal should be synchronized in a predetermined way with the reference signal stored in a memory 11, and correlates the received signal with the reference signal, one symbol at a time. If the received signal and reference signal are synchronized as assumed, a predetermined correlation value will be obtained. Differences between the predetermined correlation value and the correlation values that are actually obtained are calculated, in Hiramatsu's approach, and used to detect synchronization errors.

Independent claim 1 recites "a transition detector for detecting rising or falling transitions of pulses constituting the received pulse train," and independent claim 9 recites a corresponding method step. The Office Action acknowledges that Hiramatsu does not detect pulse transitions, and for this purpose, the Office Action turns to the Baba reference. Baba is directed to a phase locked loop using multiple clock signals with the same frequency but difference phases. Baba detects both the rising and falling transitions

of the received signal, compares the phase of the transitions with the clock signals, and selects the clock signal that provides the best match.

It is respectfully submitted that an ordinary skilled person who wanted to improve Hiramatsu's arrangement in some way would not have had an incentive to look toward Baba for assistance in this endeavor. For one thing, Hiramatsu is directed to an arrangement for detecting synchronization errors, while Baba is directed to a phase locked loop. These are not analogous arts. Moreover, Hiramatsu does not detect phase transitions, so an ordinary skilled person would not have consulted the PLL art for a way to detect transitions or to use information gleaned from the detected transitions.

On page 4, the Office Action takes the position that an ordinary skilled person would be motivated to make this combination for the sake of accurate recovery of transmitted information. Accurate recovery of transmitted information is indeed a worthy goal. The problem is, an ordinary skilled person who wanted to improve Hiramatsu's arrangement would have had no reason to think that the PLL art in general or Baba in particular would suggest a modification of Hiramatsu that would improve the accuracy of transmitted information.

The fact of matter is that neither Hiramatsu nor Baba suggests the basic idea the present invention, which is to detect synchronization errors by looking for changes in the transition timings in the received signal itself. Even if the references were combined, they would therefore not lead to the present invention.

Independent claim 1 also recites a "cyclic number generator" and "a selector for selecting a number generated by the cyclic number generator when a transition is detected by the transition detector." Independent claim 9 has similar limitations, but in

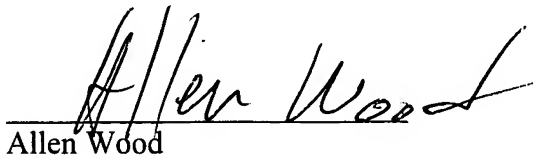
method form. Hiramatsu does not detect transitions and therefore can't have the "selector" of claim 1 (or the selecting step of claim 9). Baba does not disclose such a selector (or selecting step), either.

Claim 1 also recites "a synchronization error detector for using the numbers selected by the selector to calculate average values over groups of transitions, and for comparing successive average values thus calculated with each other, thereby detecting synchronization errors." Independent claim 9 recites similar features but in method form. Neither Hiramatsu nor Baba teaches calculating average values over groups of transitions and comparing successive average values with each other.

Since the remaining claims depend from the independent claims discussed above and recite additional limitations to further define the invention, they are patentable along with their independent claims and need not be further discussed. It is nevertheless noted that dependent claims 3 and 11 recite detecting a synchronization error when the difference between successive average values succeeds a predetermined threshold value, and this is not suggested by the references. Dependent claims 4 and 12 are directed to a specific technique for calculating the average values, and this technique is not suggested by the references. New dependent claim 19 provides that a redundancy checking circuit is disabled when the synchronization error is detected, and this is not suggested by the references. Finally, new dependent claim 20 provides for first and second communication modes, depending upon whether transmission speed or transmission quality is deemed to be more important.

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. Reconsideration of the application is therefore respectfully requested.

Respectfully submitted,



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